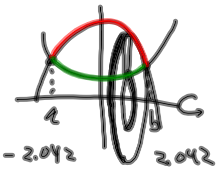
3. $y = 4-\frac{1}{2}x^2$ $\quad y = \sec(\frac{x}{2})$



$$\int_a^b \pi R^2 - \pi r^2 \, dx$$

$$\int_a^b \sqrt{1+\left(\frac{dy}{dx}\right)^2}\, dx$$

Feb 23-9:39 AM

2. $f(x) \approx p(x) = 8 - 4(x-3) + 5(x-3)^2 - 7(x-3)^3 + 9(x-3)^4 - 6(x-3)^5$

$p(t) = 8 - 4(t-3) + 5(t-3)^2$

c) $h(x) = \int_3^x f(t)\,dt$

$= 8t - \frac{4(t-3)^2}{2} + \frac{5(t-3)^3}{3} - \frac{7(t-3)^4}{4} + \frac{9(t-3)^5}{5} - \frac{6(t-3)^6}{6}\Big|_3^x$

$= 8x - \frac{4(x-3)^2}{2} + \frac{5(x-3)^3}{3} - \frac{7(x-3)^4}{4} + \frac{9(x-3)^5}{5} - \frac{6(x-3)^6}{6} - 8\cdot 3$

$= 8(x-3) - \frac{4(x-3)^2}{2} + \frac{5(x-3)^3}{3} - \frac{7(x-3)^4}{4} + \frac{9}{5}(x-3)^5 - \frac{6(x-3)^6}{6}$

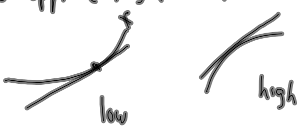
Feb 23-10:04 AM

Review 5 tangent lines & linear approximations

$y = m(x-x_1)+y_1 \qquad y - y_1 = m(x-x_1)$

$\boxed{\text{tan line at } x=a \quad y = f'(a)(x-a)+f(a)}$ first order Taylor Polynomial

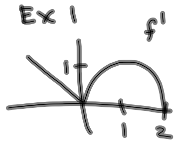
is approx high or low



f concave up $f''>0$ $\qquad$ f concave down $f''<0$

Feb 23-10:13 AM

Ex 1



find the line tan to f at (1,2)

slope = $f'(1) = 1$

(A) ~~$y=0$~~ $\qquad$ (C) $y = 1(x-1)+2$

$y = x+1$

Feb 23-10:21 AM

Ex 2.

x	$f(x)$	$f'(x)$	$f''(x)$
1	3	-2	2

a) eqn of tan to $f(x)$ at $x=1$
b) use tan line to approx $f(1.1)$
c) is the approx high or low? How do you know?

a) $y=-2(x-1)+3$ b) $-2(.1)+3=2.8$

c) low since $f''(1)=2>0$

Feb 23-10:27 AM

Ex 3 eqn of tan to

$y+2=\frac{x^2}{2}-2\sin y$ at $(2,0)$

$y'=x-2\cos y\cdot y'$

$y'=2-2\cos 0\cdot y'$

$y'=2-2\cdot 1\cdot y'$

$y'=2-2y'$

$3y'=2$

$y'=\frac{2}{3}$

$y=\frac{2}{3}(x-2)+0$

Feb 23-10:34 AM

Ex 4 $x=t^2-4t+1$

$y=t^3$

tan line at $(-3,8)$

$\frac{dy}{dx}=\frac{\frac{dy}{dt}}{\frac{dx}{dt}}=\frac{3t^2}{2t-4}\Big|_{t=2}=\frac{12}{0}$ slope dne vertical

$x=-3$

$y=8=t^3$

$t=?\ 2$

$\boxed{x=-3}$

Feb 23-10:38 AM